Theme 9| Technology, industry, products and process

Correlations between rectal and tail base temperature obtained by thermal sensor in dairy calves

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The monitoring of body temperature by a clinical thermometer is the most recognized method for identifying diseases in young dairy animals. Nevertheless, it is a laborious practice and difficult to apply on a large scale. Microchip implants with thermal sensors can be an alternative technology for measuring body temperature. This study aimed to verify the correlations between rectal temperature (RT) and body temperature predictions based on data from the microchip. Twenty-four Holstein calves were implanted with microchips subcutaneously at the tail base in the first day of life. The calves were housed individually in stalls (1.25 x 1.75 m) at birth and at 119 ± 15 days of age and 148.4 ± 20.3 kg of body weight were moved and randomly grouped in three paddocks (280 m^2). The RT measurements were obtained by a digital clinical thermometer and the microchip measurements by an RFID reader (radio frequency identification), performed simultaneously at 7 a.m. daily. The air temperature (AT), relative humidity (RH) and the temperature and humidity index (THI) were evaluated daily during the trial. Data from 65 days of observation after grouping the animals were used in a correlation analysis using Corrplot of R. Mean (± standard deviation) AT, RH and THI in the analyzed period were respectively 21.0 ± 3.7, 74.6 ± 12.1 and 68.2 ± 5.2. The microchip temperatures were smaller than the RT obtained by the thermometer (averaging -1.6ºC). The correlation between RT and the microchip data was significant (P<0.001) but low (0.35). Additionally, data from the microchip showed greater variation compared to the data from the thermometer (standard deviation ± 0.93 vs 0.49). A possible explanation for both these findings would be that the microchip was placed in a superficial region that could be highly affected by changes in environmental conditions. However, the correlation between the temperature of the microchip and the environmental variables AT, RH and THI was low, despite significant (0.12, - 0.12 and 0.10, respectively, P<0.001). These responses suggest that the use of microchip with thermal sensor was not adequate to replace the rectal temperature measurements.

Keywords: animal health, precision dairy technology, sensors

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